

Young Children Who Drown in Hot Tubs, Spas, and Whirlpools in California: A 26-Year Survey

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Abstract: A survey of drownings in hot tubs, spas, and whirlpools in California 1960–85 suggests a person- and site-specific profile. The identified 74 deaths occurred mostly in White children, under two years of age, in Southern California, during the late afternoons, from May through August. From 1967 to 1985, the drowning rate increased tenfold. The deaths were associated with access to the water, lack of supervision, neuromotor handicaps, and entrapment by suction. Educational and environmental control efforts are required to reduce the incidence. (*Am J Public Health* 1990; 80:613–614.)

Introduction

Drowning is the third leading cause of injury death nationally and the second leading cause of injury deaths at ages 1, 2, and 5.¹ A recent study in Los Angeles County (California) indicated that residential hot tubs, whirlpools, and spas (Jacuzzis) were the site of over 6 percent of all drownings for children under two years of age.² Although two reports^{3,4} mention hot water, there has been no systematic survey of this problem. Specific drowning site profiles could enhance prevention efforts. This report focuses on unintentional drownings of children which occurred in residential hot tubs, spas, and whirlpools in California from 1960 through 1985.

Methods

Data for this study were obtained from the California Master Mortality File which contains information from the death certificate, such as date of birth, date and hour of incident, date and hour of death, county of death, and race. The exact drowning location was determined for 98 percent of drownings from death certificate items that described the place of injury and how the injury occurred. Seventy-two drownings in hot tubs, spas, and whirlpools occurred in 21 of 58 California counties, and two cases involving California residents occurred out of the state. Coroners of the counties with cases were contacted, and 15 of the 21 counties provided 29 coroners' reports. These reports had information on supervision and accessibility to the hot tub, spa, or whirlpool.

Results

Between 1960 and 1979, there were only 15 drowning cases, but with the increasing popularity of residential hot tubs, spas, and whirlpools,⁴ 59 cases were reported from 1980 to 1985. The annual rates per million children aged 0–14 are shown in Figure 1. The actual number of hot tubs, spas, or

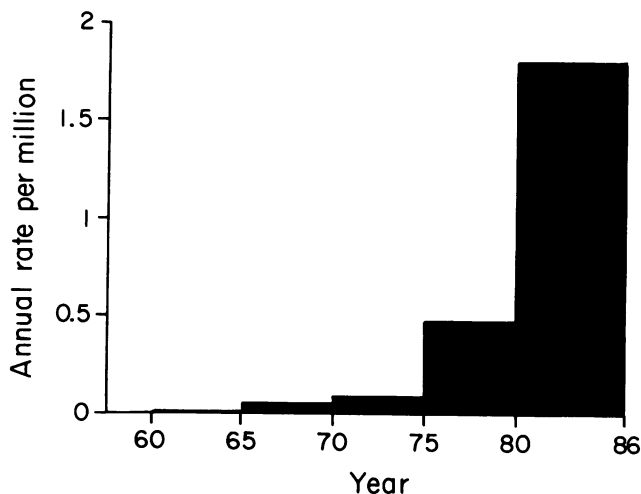


FIGURE 1—Annual Rate of Hot Tub, Spa, or Whirlpool Drownings among Children Ages 0–14 Years, California, 1960–85

whirlpools in California is unknown but is increasing, according to sales figures.

Age, Sex, Race

Children who drowned ranged in age from 10 to 41 months in 90 percent of the cases and from 3-1/2 to 11 years in the remaining 10 percent (Figure 2). Fifty-two of the 74 cases (70 percent) were ages 10 to 23 months; and in this age group, the male:female ratio was 1.2:1. All 11 children over 3 years of age who drowned were males; and the three cases of entrapment by suction occurred in males aged 9 or 10 years. The drownings included 71 White children (including Hispanics), two Blacks, and one Asian. This distribution is different from the state's population, ages 0–14 years, in the 1980 census, which was 9 percent Black and 7 percent Asian ($p = .02$). Preinjury chronic morbidity was noted in three of the 29 coroners' reports, including: cerebral palsy (age 4



FIGURE 2—Annual Rate of Hot Tub, Spa or Whirlpool Drownings, by Age, among Children Ages 0–14 Years, California, 1960–85

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years), Down's syndrome (age 15 months), and multiple handicaps with seizures (age 11 years).

Environmental Associations

The counties of Los Angeles, Orange, and San Diego accounted for 55 percent of these drownings; these three counties comprise 48 percent of the state's population. Most incidents occurred from May through August (Figure 3). The absence of events in December and January over a 26-year period is noteworthy, although hot tubs, spas, and whirlpools are used frequently during these months. Two-thirds of hot tub, spa, and whirlpool drownings occurred on Friday-Monday; 45 percent occurred between 4:00-8:00 pm.

In the 29 coroners' reports, an adult supervisor was not present at the hot tub, spa, or whirlpool in 21 cases, and was distracted in four cases. In the four other cases, more than one adult was supervising the child, but none was aware of the child's location. Problems with access included: lack of fencing and self-locking gate, direct access to the site from the residence through sliding glass doors, and hard cover not in use. In two cases, floating soft covers not only did not support the child but were reported to obscure the submerged child from rescuers.

One unique risk associated with this drowning site deserves special mention: entrapment by suction to the water intake to the pump. This occurred with healthy males—not by entrapment of hair, but by suction of the abdominal wall

or an upper extremity—in one case, with such great force that special equipment was required for postmortem removal.

In 31 of the 74 cases, more than 24 hours separated the time of immersion and time of death. Twenty-seven of these children were age 10–23 months, and those in this age group were four times more likely than older children to survive for 24 hours after immersion.

Discussion

The results of this survey indicate that residential hot tubs, spas, or whirlpools represent a poorly recognized but high-risk drowning site for young children. Very young children are mobile enough to escape adult supervision, but unable to get out of a hot tub. The five cases aged 4 years or older involved either suction entrapment or a child with a neuromotor disability. Both entrapment⁵ and seizure disorders⁶ are related to drowning in other environments.

Several preventive strategies are suggested by these findings. Stringent fencing ordinances are needed for all hot tub, spa, and whirlpool installations, as for swimming pools. Jet pump intakes must be multiple and always covered by grates. Locking hard covers are an effective barrier; soft covers may be hazardous and, hence, should be restricted from use as a preventive barrier. Public warnings of the hazard might be issued through the media, and manufacturer's instructions for installation and use of the hot tub, spa, or whirlpool should contain explicit warnings and safety suggestions.

ACKNOWLEDGMENT

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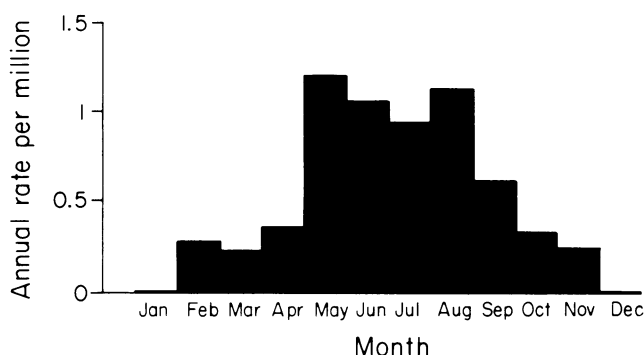


FIGURE 3—Annual Rate of Childhood Hot Tub, Spa or Whirlpool Drownings, by Month of Occurrence, among Children Ages 0–14 Years, California, 1960–85